Ingersoll Rand

TEST REPORT FOR

SSU89

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207, 15.209, 15.225
and
RSS 210 Issue 8

Report No.: 93045-17

Date of issue: May 25, 2012

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Testing the Future
CKC LABORATORIES, INC.

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Ingersoll Rand
500 Golden Ridge Road
Bldg. 1, Suite 160
Golden, CO 80401

Representative: Bryan Hoff
Customer Reference Number: 4013052

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 92314

DATE OF EQUIPMENT RECEIPT: April 17, 2012
DATE(S) OF TESTING: April 17-May 1, 2012

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Site Registration & Accreditation Information

Location	CB #	Taiwan	Canada	FCC	Japan
Mariposa A	US0103	SL2-IN-E-1147R	3082A-2	90477	R-563 C-578 T-1492 G-87

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C 15.207, 15.225 and RSS 210 Issue 8

Description	Test Procedure/Method	Results
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2009)	Pass
Carrier Radiated Emissions	FCC Part 15 Subpart C Section 15.225 (a)(b)(c) / ANSI C63.4 (2009)	Pass
Spurious Radiated Emissions	FCC Part 15 Subpart C Section 15.225 (d) / ANSI C63.4 (2009)	Pass
Frequency Stability	FCC Part 15 Subpart C Section 15.225 (e) / ANSI C63.4 (2009) / ANSI C63.10 (2009)	Pass
99% Bandwidth	RSS 210 Issue 8	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

The following model has been tested by CKC Laboratories: **SSU89**

The manufacturer states that the following additional models are identical electrically to the one which was tested, or any differences between them do not affect their EMC characteristics, and therefore they meet the level of testing equivalent to the tested models. **SUSBMU, SSRLMU, SUSB89 and SSRL89**

EQUIPMENT UNDER TEST

Manuf: Ingersoll Rand
Model: **SSU89**
Serial: E0001 (USB, RS232)

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Laptop Computer
Manuf: Lenovo
Model: Thinkpad 2842
Serial: LR-ZZW25

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.207 Conducted Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 425-402-1717

Customer: **Ingersoll Rand**
Specification: **15.207 AC Mains - Average**
Work Order #: **93045** Date: 4/18/2012
Test Type: **Conducted Emissions** Time: 13:11:10
Equipment: **.** Sequence#: 5
Manufacturer: Ingersoll Rand Tested By: Michael Rauch Jr.
Model: SSU89 120V 60Hz
S/N: E0001 (RS232)

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01184	Spectrum Analyzer	8568B	5/4/2011	5/4/2013
T2	AN01183	Spectrum Analyzer Display	85662A	5/4/2011	5/4/2013
T3	ANP00082	Attenuator	PE7002-10	6/7/2011	6/7/2013
T4	ANMACOND	Cable		5/10/2011	5/10/2013
T5	AN00374	50uH LISN-Black Lead Amplitude (dB)	8028-TS-50-BNC	10/31/2011	10/31/2013
	AN00374	50uH LISN-White Lead Amplitude (dB)	8028-TS-50-BNC	10/31/2011	10/31/2013
T6	AN02608	High Pass Filter	HE9615-150K-50-720B	3/15/2012	3/15/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
.*	Ingersoll Rand	SSU89	E0001 (RS232)

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Lenovo	Thinkpad 2842	LR-ZZW25

Test Conditions / Notes:

EUT set up a wooden table in the center of flush mounted turntable.
EUT support equipment is located on top of the turntable.
Frequencies investigated: 150k to 30MHz
Clock Frequencies of interest are: 8MHz, 27.12MHz
TX Freq: 13.56MHz
RBW used in accordance with CISPR 16, VBW is greater than RBW

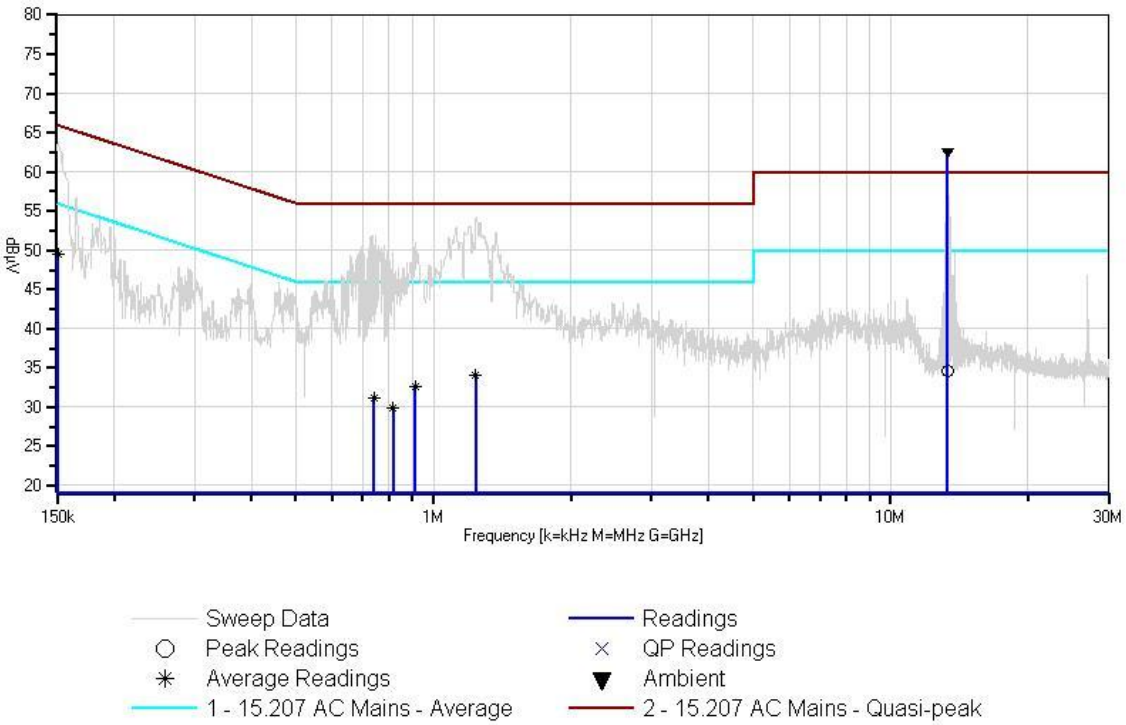
13.56MHz Transmitter output terminals have been terminated with a characteristic load.
Temperature = 17°C
Relative Humidity = 51%
Pressure = 97.7 kPa

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	13.328M	51.3	+0.0	+0.0	+10.1	+1.0	+0.0	62.6	50.0	+12.6	Black
	Ambient		+0.1	+0.1					EUT with integral antenna attached		
2	150.727k	26.6	+0.0	+0.0	+10.0	+0.1	+0.0	49.5	56.0	-6.5	Black
	Ave		+4.9	+7.9							
^	150.727k	41.0	+0.0	+0.0	+10.0	+0.1	+0.0	63.9	56.0	+7.9	Black
			+4.9	+7.9							
4	1.239M	19.7	+0.0	+0.0	+10.0	+0.3	+0.0	34.0	46.0	-12.0	Black
	Ave		+3.8	+0.2							
^	1.239M	39.9	+0.0	+0.0	+10.0	+0.3	+0.0	54.2	46.0	+8.2	Black
			+3.8	+0.2							
6	911.024k	18.0	+0.0	+0.0	+10.0	+0.3	+0.0	32.6	46.0	-13.4	Black
	Ave		+4.1	+0.2							
^	911.024k	36.4	+0.0	+0.0	+10.0	+0.3	+0.0	51.0	46.0	+5.0	Black
			+4.1	+0.2							
8	741.941k	16.4	+0.0	+0.0	+10.0	+0.3	+0.0	31.1	46.0	-14.9	Black
	Ave		+4.2	+0.2							
^	741.941k	35.9	+0.0	+0.0	+10.0	+0.3	+0.0	50.6	46.0	+4.6	Black
			+4.2	+0.2							
10	13.328M	23.4	+0.0	+0.0	+10.1	+1.0	+0.0	34.7	50.0	-15.3	Black
			+0.1	+0.1					EUT with dummy load attached		
11	815.388k	15.3	+0.0	+0.0	+10.0	+0.3	+0.0	29.9	46.0	-16.1	Black
	Ave		+4.1	+0.2							
^	815.388k	35.1	+0.0	+0.0	+10.0	+0.3	+0.0	49.7	46.0	+3.7	Black
			+4.1	+0.2							

CKC Laboratories, Inc. Date: 4/18/2012 Time: 13:11:10 Ingersoll Rand WO#: 93045
15.207 AC Mains - Average Test Lead: Black Black Sequence#: 5 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 425-402-1717

Customer: **Ingersoll Rand**
Specification: **15.207 AC Mains - Average**
Work Order #: **93045** Date: 4/18/2012
Test Type: **Conducted Emissions** Time: 12:55:10
Equipment: **.** Sequence#: 6
Manufacturer: Ingersoll Rand Tested By: Michael Rauch Jr.
Model: SSU89 120V 60Hz
S/N: E0001 (RS232)

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01184	Spectrum Analyzer	8568B	5/4/2011	5/4/2013
T2	AN01183	Spectrum Analyzer Display	85662A	5/4/2011	5/4/2013
T3	ANP00082	Attenuator	PE7002-10	6/7/2011	6/7/2013
T4	ANMACOND	Cable		5/10/2011	5/10/2013
	AN00374	50uH LISN-Black Lead Amplitude (dB)	8028-TS-50-BNC	10/31/2011	10/31/2013
T5	AN00374	50uH LISN-White Lead Amplitude (dB)	8028-TS-50-BNC	10/31/2011	10/31/2013
T6	AN02608	High Pass Filter	HE9615-150K-50-720B	3/15/2012	3/15/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
.*	Ingersoll Rand	SSU89	E0001 (RS232)

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Lenovo	Thinkpad 2842	LR-ZZW25

Test Conditions / Notes:

EUT set up a wooden table in the center of flush mounted turntable.
EUT support equipment is located on top of the turntable.

Frequencies investigated: 150k to 30MHz
Clock Frequencies of interest are: 8MHz, 27.12MHz
TX Freq: 13.56MHz
RBW used in accordance with CISPR 16, VBW is greater than RBW
13.56MHz Transmitter output terminals have been terminated with a characteristic load.
Temperature = 17°C
Relative Humidity = 51%
Pressure = 97.7 kPa

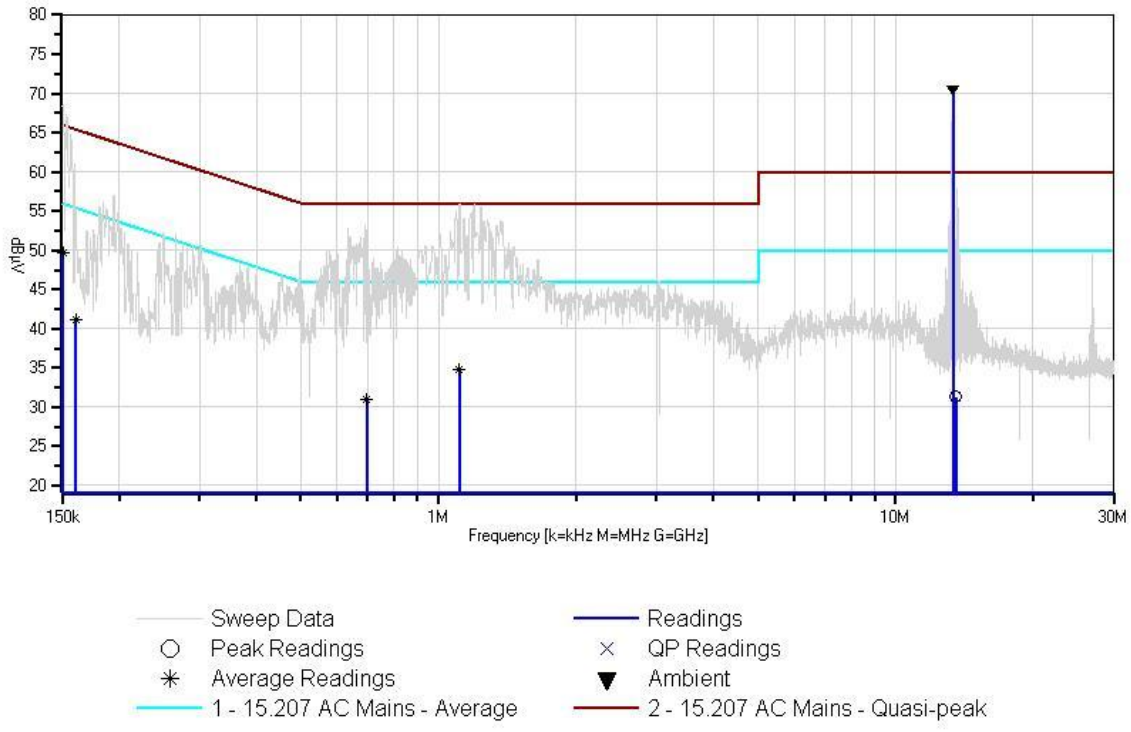
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	13.346M	59.3	+0.0	+0.0	+10.1	+1.0	+0.0	70.6	50.0	+20.6	White
	Ambient		+0.1	+0.1					EUT with integral antenna attached		

2	150.727k	31.6	+0.0	+0.0	+10.0	+0.1	+0.0	49.6	56.0	-6.4	White
	Ave		+0.0	+7.9							
^	150.727k	45.8	+0.0	+0.0	+10.0	+0.1	+0.0	68.6	56.0	+12.6	White
			+4.8	+7.9							
4	1.110M	20.4	+0.0	+0.0	+10.0	+0.3	+0.0	34.9	46.0	-11.1	White
	Ave		+4.0	+0.2							
^	1.111M	41.4	+0.0	+0.0	+10.0	+0.3	+0.0	55.9	46.0	+9.9	White
			+4.0	+0.2							
6	161.000k	25.8	+0.0	+0.0	+10.0	+0.1	+0.0	41.1	55.4	-14.3	White
	Ave		+4.8	+0.4							
^	160.181k	45.7	+0.0	+0.0	+10.0	+0.1	+0.0	61.0	55.5	+5.5	White
			+4.8	+0.4							
8	697.000k	16.3	+0.0	+0.0	+10.0	+0.2	+0.0	30.9	46.0	-15.1	White
	Ave		+4.2	+0.2							
^	697.582k	38.1	+0.0	+0.0	+10.0	+0.2	+0.0	52.7	46.0	+6.7	White
			+4.2	+0.2							
10	13.560M	20.1	+0.0	+0.0	+10.1	+1.0	+0.0	31.3	50.0	-18.7	White
			+0.1	+0.0					EUT with dummy load attached		

CKC Laboratories, Inc. Date: 4/18/2012 Time: 12:55:10 Ingersoll Rand WO#: 93045
15.207 AC Mains - Average Test Lead: White White Sequence#: 6 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 425-402-1717

Customer: **Ingersoll Rand**
Specification: **15.207 AC Mains - Average**
Work Order #: **93045** Date: 4/18/2012
Test Type: **Conducted Emissions** Time: 14:10:18
Equipment: **.** Sequence#: 6
Manufacturer: Ingersoll Rand Tested By: Michael Rauch Jr.
Model: SSU89 120V 60Hz
S/N: E0001 (USB)

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01184	Spectrum Analyzer	8568B	5/4/2011	5/4/2013
T2	AN01183	Spectrum Analyzer Display	85662A	5/4/2011	5/4/2013
T3	ANP00082	Attenuator	PE7002-10	6/7/2011	6/7/2013
T4	ANMACOND	Cable		5/10/2011	5/10/2013
T5	AN00374	50uH LISN-Black Lead Amplitude (dB)	8028-TS-50-BNC	10/31/2011	10/31/2013
	AN00374	50uH LISN-White Lead Amplitude (dB)	8028-TS-50-BNC	10/31/2011	10/31/2013
T6	AN02608	High Pass Filter	HE9615-150K-50-720B	3/15/2012	3/15/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
.*	Ingersoll Rand	SSU89	E0001 (USB)

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Lenovo	Thinkpad 2842	LR-ZZW25

Test Conditions / Notes:

EUT set up a wooden table in the center of flush mounted turntable.
EUT support equipment is located on top of the turntable.
Frequencies investigated: 150k to 30MHz
Clock Frequencies of interest are: 8MHz, 27.12MHz
TX Freq: 13.56MHz
RBW used in accordance with CISPR 16, VBW is greater than RBW
13.56MHz Transmitter output terminals have been terminated with a characteristic load.
Temperature = 17°C
Relative Humidity = 51%
Pressure = 97.7 kPa

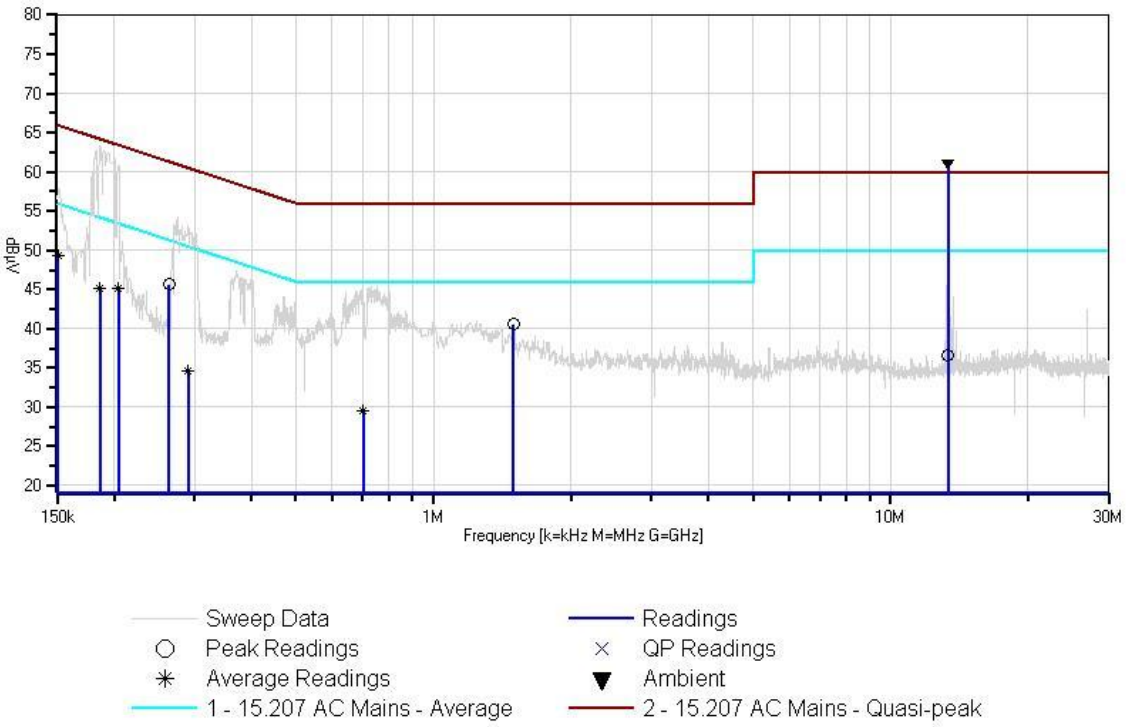
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	13.346M	49.9	+0.0	+0.0	+10.1	+1.0	+0.0	61.2	50.0	+11.2	Black
	Ambient		+0.1	+0.1					EUT with integral antenna attached		
2	1.498M	27.1	+0.0	+0.0	+10.0	+0.4	+0.0	40.6	46.0	-5.4	Black
			+2.9	+0.2							

3	264.170k	30.6	+0.0 +4.6	+0.0 +0.2	+10.0	+0.2	+0.0	45.6	51.3	-5.7	Black
4	151.000k Ave	26.6	+0.0 +4.9	+0.0 +7.7	+10.0	+0.1	+0.0	49.3	55.9	-6.6	Black
^	151.454k	35.8	+0.0 +4.8	+0.0 +7.3	+10.0	+0.1	+0.0	58.0	55.9	+2.1	Black
6	204.540k Ave	30.2	+0.0 +4.7	+0.0 +0.2	+10.0	+0.1	+0.0	45.2	53.4	-8.2	Black
^	204.540k	45.9	+0.0 +4.7	+0.0 +0.2	+10.0	+0.1	+0.0	60.9	53.4	+7.5	Black
^	208.176k	36.1	+0.0 +4.7	+0.0 +0.2	+10.0	+0.1	+0.0	51.1	53.3	-2.2	Black
9	186.360k Ave	30.0	+0.0 +4.8	+0.0 +0.3	+10.0	+0.1	+0.0	45.2	54.2	-9.0	Black
^	186.360k	48.2	+0.0 +4.8	+0.0 +0.3	+10.0	+0.1	+0.0	63.4	54.2	+9.2	Black
11	13.346M	25.4	+0.0 +0.1	+0.0 +0.1	+10.1	+1.0	+0.0	36.7	50.0 EUT with dummy load attached	-13.3	Black
12	290.350k Ave	19.7	+0.0 +4.6	+0.0 +0.1	+10.0	+0.2	+0.0	34.6	50.5	-15.9	Black
^	290.350k	38.2	+0.0 +4.6	+0.0 +0.1	+10.0	+0.2	+0.0	53.1	50.5	+2.6	Black
14	701.218k Ave	15.0	+0.0 +4.2	+0.0 +0.2	+10.0	+0.2	+0.0	29.6	46.0	-16.4	Black
^	701.218k	31.2	+0.0 +4.2	+0.0 +0.2	+10.0	+0.2	+0.0	45.8	46.0	-0.2	Black

CKC Laboratories, Inc. Date: 4/18/2012 Time: 14:10:18 Ingersoll Rand WO#: 93045
15.207 AC Mains - Average Test Lead: Black Black Sequence#: 6 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 425-402-1717

Customer: **Ingersoll Rand**
Specification: **15.207 AC Mains - Average**
Work Order #: **93045** Date: 4/18/2012
Test Type: **Conducted Emissions** Time: 13:55:03
Equipment: **.** Sequence#: 7
Manufacturer: Ingersoll Rand Tested By: Michael Rauch Jr.
Model: SSU89 120V 60Hz
S/N: E0001 (USB)

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01184	Spectrum Analyzer	8568B	5/4/2011	5/4/2013
T2	AN01183	Spectrum Analyzer Display	85662A	5/4/2011	5/4/2013
T3	ANP00082	Attenuator	PE7002-10	6/7/2011	6/7/2013
T4	ANMACOND	Cable		5/10/2011	5/10/2013
	AN00374	50uH LISN-Black Lead Amplitude (dB)	8028-TS-50-BNC	10/31/2011	10/31/2013
T5	AN00374	50uH LISN-White Lead Amplitude (dB)	8028-TS-50-BNC	10/31/2011	10/31/2013
T6	AN02608	High Pass Filter	HE9615-150K-50-720B	3/15/2012	3/15/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
.*	Ingersoll Rand	SSU89	E0001 (USB)

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Lenovo	Thinkpad 2842	LR-ZZW25

Test Conditions / Notes:

EUT set up a wooden table in the center of flush mounted turntable.
EUT support equipment is located on top of the turntable.
Frequencies investigated: 150k to 30MHz
Clock Frequencies of interest are: 8MHz, 27.12MHz
TX Freq: 13.56MHz
RBW used in accordance with CISPR 16, VBW is greater than RBW
13.56MHz Transmitter output terminals have been terminated with a characteristic load.
Temperature = 17°C
Relative Humidity = 51%
Pressure = 97.7 kPa

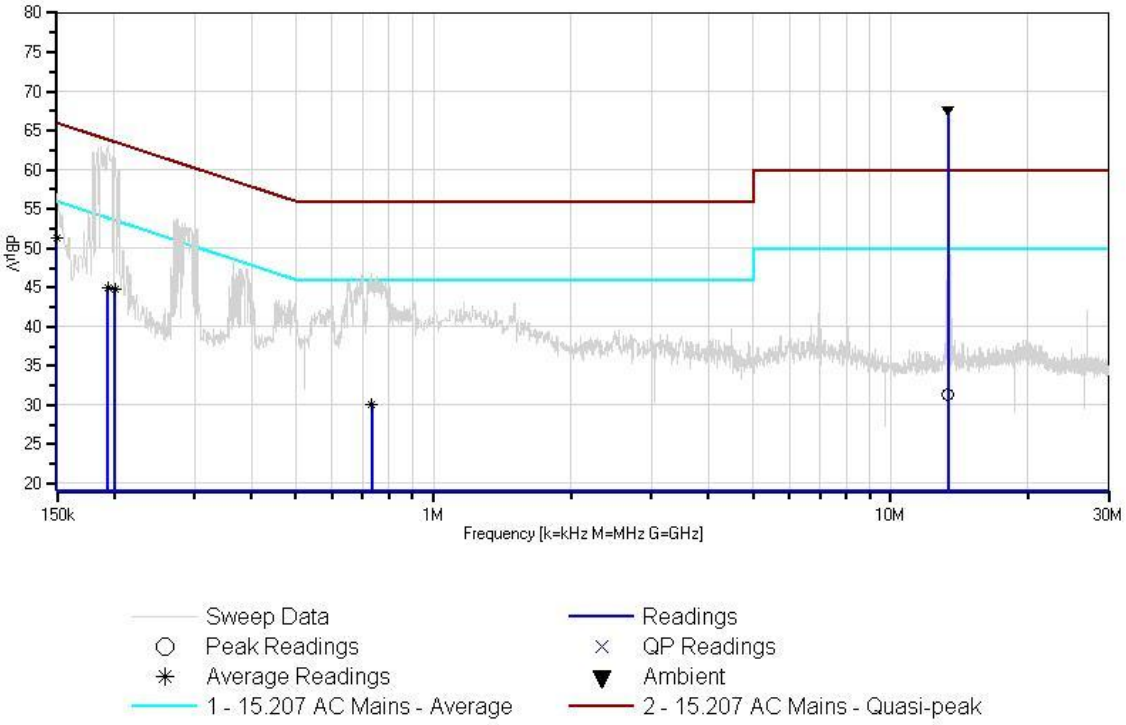
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	13.355M	56.4	+0.0	+0.0	+10.1	+1.0	+0.0	67.7	50.0	+17.7	White
	Ambient		+0.1	+0.1					EUT with integral antenna attached		
2	150.000k	28.0	+0.0	+0.0	+10.0	+0.1	+0.0	51.4	56.0	-4.6	White
	Ave		+4.8	+8.5							

^	150.000k	33.6	+0.0 +4.8	+0.0 +8.5	+10.0	+0.1	+0.0	57.0	56.0	+1.0	White
4 Ave	200.904k	29.8	+0.0 +4.7	+0.0 +0.2	+10.0	+0.1	+0.0	44.8	53.6	-8.8	White
^	200.904k	46.6	+0.0 +4.7	+0.0 +0.2	+10.0	+0.1	+0.0	61.6	53.6	+8.0	White
6 Ave	193.632k	29.9	+0.0 +4.7	+0.0 +0.2	+10.0	+0.1	+0.0	44.9	53.9	-9.0	White
^	193.632k	48.2	+0.0 +4.7	+0.0 +0.2	+10.0	+0.1	+0.0	63.2	53.9	+9.3	White
8 Ave	733.214k	15.4	+0.0 +4.2	+0.0 +0.2	+10.0	+0.3	+0.0	30.1	46.0	-15.9	White
^	733.214k	32.1	+0.0 +4.2	+0.0 +0.2	+10.0	+0.3	+0.0	46.8	46.0	+0.8	White
10	13.355M	20.1	+0.0 +0.1	+0.0 +0.1	+10.1	+1.0	+0.0	31.4	50.0 EUT with dummy load attached	-18.6	White

CKC Laboratories, Inc. Date: 4/18/2012 Time: 13:55:03 Ingersoll Rand WO#: 93045
15.207 AC Mains - Average Test Lead: White White Sequence#: 7 Ext ATTN: 0 dB

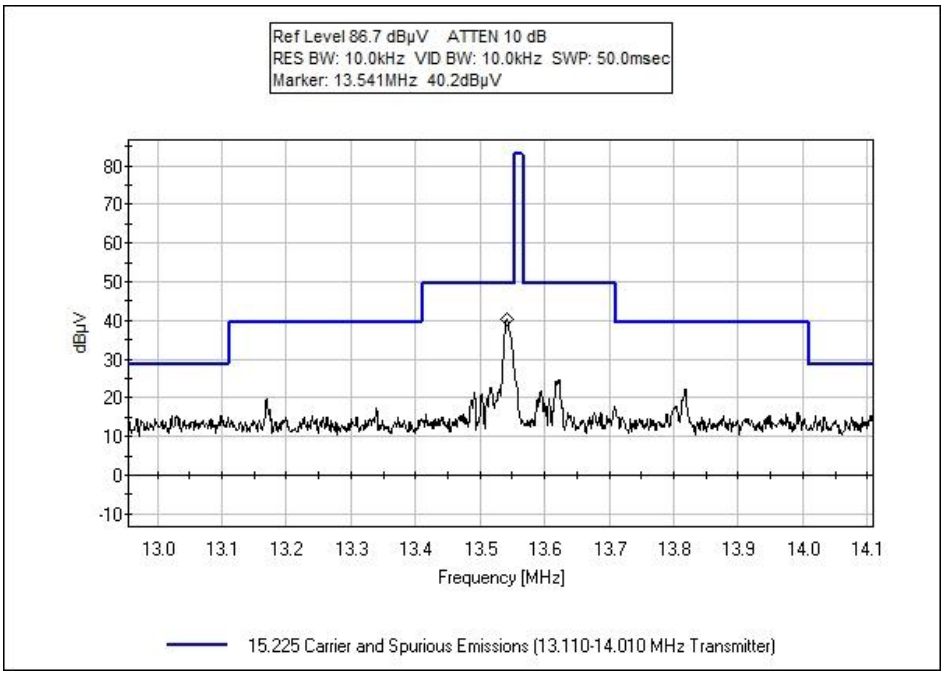


Test Setup Photos

15.225(a)(b)(c)(d) Carrier and Spurious Emissions

Carrier Radiated Emissions

Test Data



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • (209) 966-5240

Customer: **Ingersoll Rand**
Specification: **15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**
Work Order #: **93045** Date: 4/18/2012
Test Type: **Maximized Emissions** Time: 16:06:56
Equipment: **.** Sequence#: 2
Manufacturer: Ingersoll Rand Tested By: Michael Rauch Jr.
Model: SSU89
S/N: E0001 (USB, RS232)

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01184	Spectrum Analyzer	8568B	5/4/2011	5/4/2013
T2	AN01183	Spectrum Analyzer Display	85662A	5/4/2011	5/4/2013
T3	AN00226	Loop Antenna	6502	3/28/2012	3/28/2014
T4	ANP01017	Cable		3/16/2012	3/16/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
.*	Ingersoll Rand	SSU89	E0001 (USB, RS232)

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Lenovo	Thinkpad 2842	LR-ZZW25

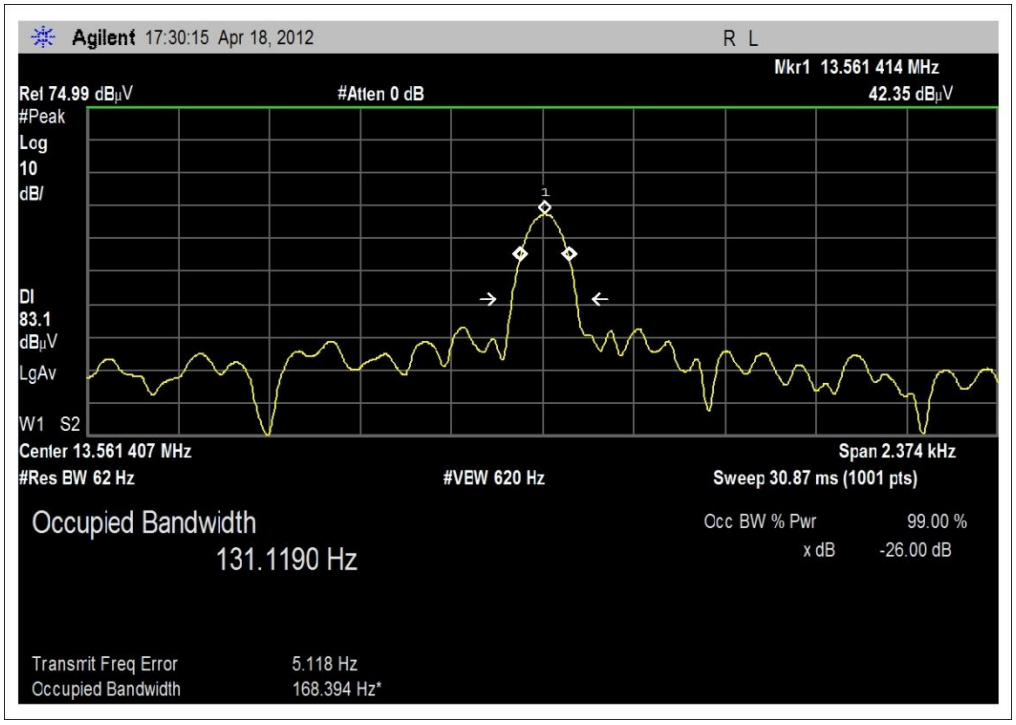
Test Conditions / Notes:

EUT set up a wooden table in the center of flush mounted turntable.
EUT support equipment is located on the flush mounted turntable.
Frequencies investigated: carrier
Clock Frequencies of interest are: 8MHz, 27.12MHz
TX Freq: 13.56MHz
RBW used in accordance with CISPR 16, VBW is greater than RBW
Temperature = 20°C
Relative Humidity = 52%
Pressure = 97.7 kPa

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	13.562M	43.2	+0.0	+0.0	+9.6	+0.8	-9.5	44.1	84.0	-39.9	Horiz
2	13.558M	41.5	+0.0	+0.0	+9.6	+0.8	-9.5	42.4	84.0	-41.6	Vert


Agilent 17:30:15 Apr 18, 2012
R L
Mkr1 13.561 414 MHz
Ref 74.99 dBµV
#Atten 0 dB
42.35 dBµV
#Peak
Log
10
dB/
1
DI
83.1
dBµV
LgAv
W1 S2
Center 13.561 407 MHz
Span 2.374 kHz
#Res BW 62 Hz
#VBW 620 Hz
Sweep 30.87 ms (1001 pts)
Occupied Bandwidth
131.1190 Hz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error 5.118 Hz
Occupied Bandwidth 168.394 Hz*

Spurious Radiated Emissions

Test Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • (209) 966-5240

Customer: **Ingersoll Rand**
Specification: **15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**
Work Order #: **93045** Date: 4/19/2012
Test Type: **Maximized Emissions** Time: 14:11:35
Equipment: **.** Sequence#: 1
Manufacturer: Ingersoll Rand Tested By: Michael Rauch Jr.
Model: SSU89
S/N: E0001 (USB, RS232)

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANdBuA	Unit Conversion		1/30/2012	1/30/2014
T1	AN00226	Loop Antenna	6502	3/28/2012	3/28/2014
T2	ANP01017	Cable		3/16/2012	3/16/2014
	AN02660	Spectrum Analyzer	E4446A	11/3/2011	11/3/2013

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
.*	Ingersoll Rand	SSU89	E0001 (USB, RS232)

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Lenovo	Thinkpad 2842	LR-ZZW25

Test Conditions / Notes:

EUT set up a wooden table in the center of flush mounted turntable.
EUT support equipment is located on top of the wooden table.

Frequencies investigated: 9KHz to 30MHz
Clock Frequencies of interest are: 8MHz, 27.12MHz
TX Freq: 13.56MHz

RBW used in accordance with CISPR 16, VBW is greater than RBW
Temperature = 20°C
Relative Humidity = 52%
Pressure = 97.7 kPa

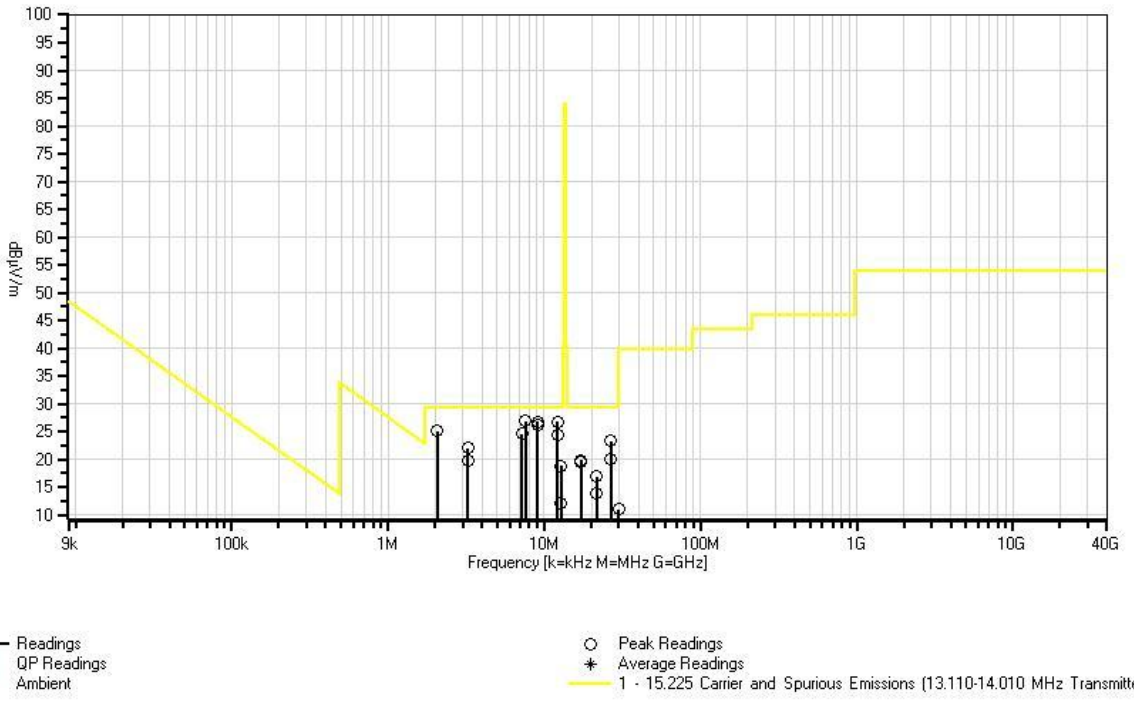
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	7.597M	25.8	+9.9	+0.6			-9.5	26.8	29.5	-2.7	Vert
2	9.086M	25.6	+9.9	+0.7			-9.5	26.7	29.5	-2.8	Horiz
3	12.157M	25.7	+9.7	+0.8			-9.5	26.7	29.5	-2.8	Horiz

4	9.085M	25.1	+9.9	+0.7	-9.5	26.2	29.5	-3.3	Vert
5	2.068M	24.4	+9.9	+0.3	-9.5	25.1	29.5	-4.4	Vert
6	7.201M	23.5	+9.9	+0.6	-9.5	24.5	29.5	-5.0	Horiz
7	12.104M	23.3	+9.7	+0.8	-9.5	24.3	29.5	-5.2	Horiz
8	26.587M	24.6	+7.0	+1.2	-9.5	23.3	29.5	-6.2	Horiz
9	3.244M	21.3	+9.8	+0.4	-9.5	22.0	29.5	-7.5	Horiz
10	26.587M	21.4	+7.0	+1.2	-9.5	20.1	29.5	-9.4	Vert
11	17.146M	19.7	+8.8	+0.9	-9.5	19.9	29.5	-9.6	Horiz
12	3.234M	19.1	+9.8	+0.4	-9.5	19.8	29.5	-9.7	Vert
13	17.149M	19.2	+8.8	+0.9	-9.5	19.4	29.5	-10.1	Vert
14	12.792M	17.8	+9.7	+0.8	-9.5	18.8	29.5	-10.7	Horiz
15	21.689M	17.5	+7.9	+1.0	-9.5	16.9	29.5	-12.6	Horiz
16	21.690M	14.4	+7.9	+1.0	-9.5	13.8	29.5	-15.7	Vert
17	12.782M	11.2	+9.7	+0.8	-9.5	12.2	29.5	-17.3	Vert
18	29.882M	13.2	+5.9	+1.3	-9.5	10.9	29.5	-18.6	Horiz

CKC Laboratories, Inc. Date: 4/19/2012 Time: 14:11:35 Ingersoll Rand WO#: 93045
15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter) Test Distance: 10 Meters Vert
Sequence#: 1 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 425-402-1717

Customer: **Ingersoll Rand**
Specification: **15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**
Work Order #: **93045** Date: 4/17/2012
Test Type: **Maximized Emissions** Time: 13:48:17
Equipment: **.** Sequence#: 1
Manufacturer: Ingersoll Rand Tested By: Michael Rauch Jr.
Model: SSU89
S/N: E0001 (USB, RS232)

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN01183	Spectrum Analyzer Display	85662A	5/4/2011	5/4/2013
	AN01184	Spectrum Analyzer	8568B	5/4/2011	5/4/2013
T1	AN00062	Preamp	8447D	6/23/2010	6/23/2012
T2	ANMA10M	Cable		5/10/2011	5/10/2013
T3	AN01991	Biconilog Antenna	CBL6111C	11/16/2010	11/16/2012

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
.*	Ingersoll Rand	SSU89	E0001 (USB, RS232)

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Lenovo	Thinkpad 2842	LR-ZZW25

Test Conditions / Notes:

EUT set up a wooden table in the center of flush mounted turntable.
EUT support equipment is located on top of the wooden table.
Frequencies investigated: 30MHz to 1000MHz
Clock Frequencies of interest are: 8MHz, 27.12MHz
TX Freq: 13.56MHz
RBW used in accordance with CISPR 16, VBW is greater than RBW
Temperature = 20°C
Relative Humidity = 52%
Pressure = 97.7 kPa

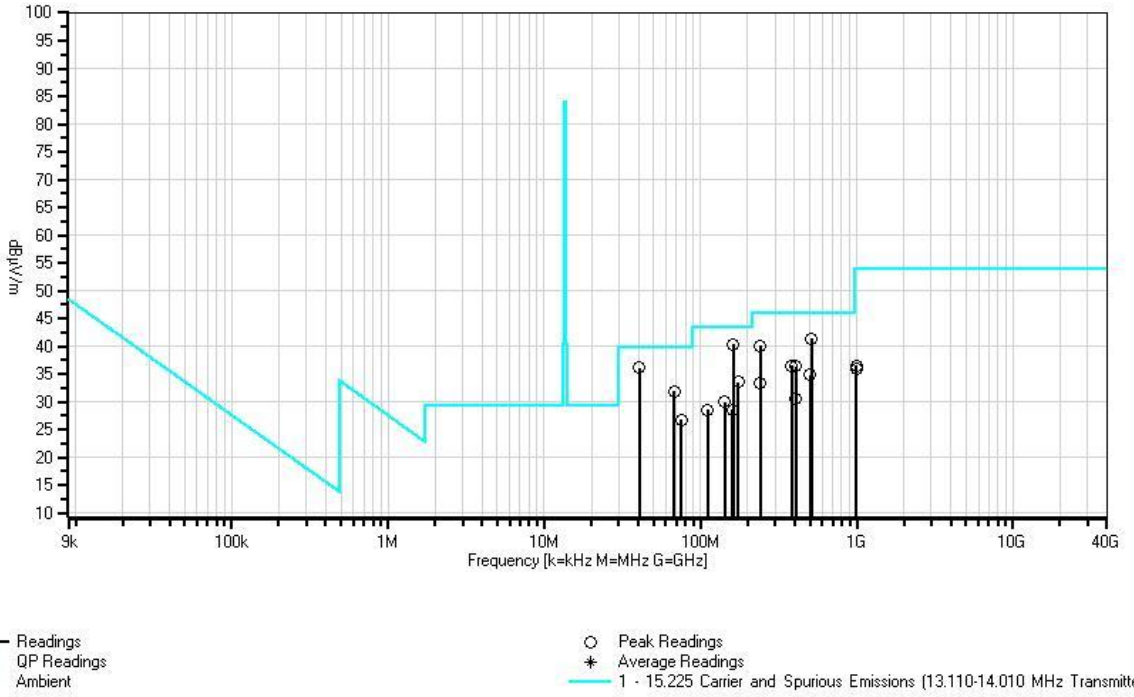
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	162.760M	47.0	-30.4	+2.8	+10.4		+10.5	40.3	43.5	-3.2	Vert
2	40.681M	41.5	-31.0	+1.4	+13.7		+10.5	36.1	40.0	-3.9	Vert
3	515.309M	38.0	-30.6	+5.3	+18.1		+10.5	41.3	46.0	-4.7	Vert
4	240.029M	44.2	-30.0	+3.5	+11.9		+10.5	40.1	46.0	-5.9	Vert
5	67.782M	43.3	-30.9	+1.8	+7.2		+10.5	31.9	40.0	-8.1	Vert
6	381.842M	36.6	-30.3	+4.5	+15.2		+10.5	36.5	46.0	-9.5	Horiz

7	381.816M	36.5	-30.3	+4.5	+15.2	+10.5	36.4	46.0	-9.6	Vert
8	406.861M	35.9	-30.4	+4.6	+15.8	+10.5	36.4	46.0	-9.6	Horiz
9	174.306M	41.2	-30.3	+3.0	+9.1	+10.5	33.5	43.5	-10.0	Horiz
10	504.039M	31.8	-30.5	+5.2	+17.8	+10.5	34.8	46.0	-11.2	Vert
11	240.013M	37.4	-30.0	+3.5	+11.9	+10.5	33.3	46.0	-12.7	Horiz
12	75.008M	37.6	-30.8	+1.9	+7.6	+10.5	26.8	40.0	-13.2	Horiz
13	143.181M	36.2	-30.6	+2.6	+11.3	+10.5	30.0	43.5	-13.5	Vert
14	143.174M	36.2	-30.6	+2.6	+11.3	+10.5	30.0	43.5	-13.5	Vert
15	110.577M	35.7	-30.7	+2.3	+10.8	+10.5	28.6	43.5	-14.9	Horiz
16	159.995M	35.0	-30.5	+2.8	+10.7	+10.5	28.5	43.5	-15.0	Vert
17	406.833M	30.1	-30.4	+4.6	+15.8	+10.5	30.6	46.0	-15.4	Vert
18	995.370M	25.8	-29.5	+7.8	+21.9	+10.5	36.5	54.0	-17.5	Vert
19	995.323M	25.2	-29.5	+7.8	+21.9	+10.5	35.9	54.0	-18.1	Horiz

CKC Laboratories, Inc. Date: 4/17/2012 Time: 13:48:17 Ingersoll Rand WO#: 93045
15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter) Test Distance: 10 Meters Vert
Sequence#: 1 Ext ATTN: 0 dB



Test Setup Photos

Frequency Stability

Test Set Up / Conditions

The Equipment is located in a temperature chamber. A loop antenna is set inside the chamber and connected to a spectrum analyzer. Voltage variations are performed using support power supply and monitored using a digital volt meter. Enclosure temperature is monitored using a digital thermometer with a sensor attached direction to the case of the EUT.

Engineer Name: M. Rauch Jr.

Test Equipment

Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
01879	Temperature Chamber	S-1.2 Min.	Thermotron	12/1/2010	12/1/2012
00170	Loop Antenna	7334-1	Solar	NCR	NCR
02660	Spectrum Analyzer	E4446A	Agilent	11/3/2011	11/3/2013
00483	Multimeter	75	Fluke	7/28/2010	7/28/2012
03197	Multimeter	MM570A	Extech	9/28/2010	9/28/2012

NCR= No Calibration Required.

Data

Temperature Variations						
		Channel 1 (MHz)	Dev. (%)		Channel 1 (MHz)	Dev. (MHz)
Channel Frequency:		13.561			13.561	
Temp (C)	Voltage					
-30	120V	13.56151	0.00376		13.56151	0.00376
-20	120V	13.56220	0.00885		13.56116	0.00118
-10	120V	13.56125	0.00184		13.56125	0.00184
0	120V	13.56211	0.00819		13.56125	0.00184
10	120V	13.56116	0.00118		13.56133	0.00243
20	120V	13.56151	0.00376		13.56142	0.00310
30	120V	13.56203	0.00760		13.56125	0.00184
40	120V	13.56125	0.00184		13.56142	0.00310
50	120V	13.56133	0.00243		13.56151	0.00376

Voltage Variations (±15%)						
20	102.0	13.56151	0.00376		13.56133	0.00243
20	120V	13.56151	0.00376		13.56142	0.00310
20	138.0	13.56159	0.00435		13.56142	0.00310
Max Deviation (%)			0.00885			0.00376
			PASS			PASS

Test Setup Photos

RSS-210

99 % Bandwidth

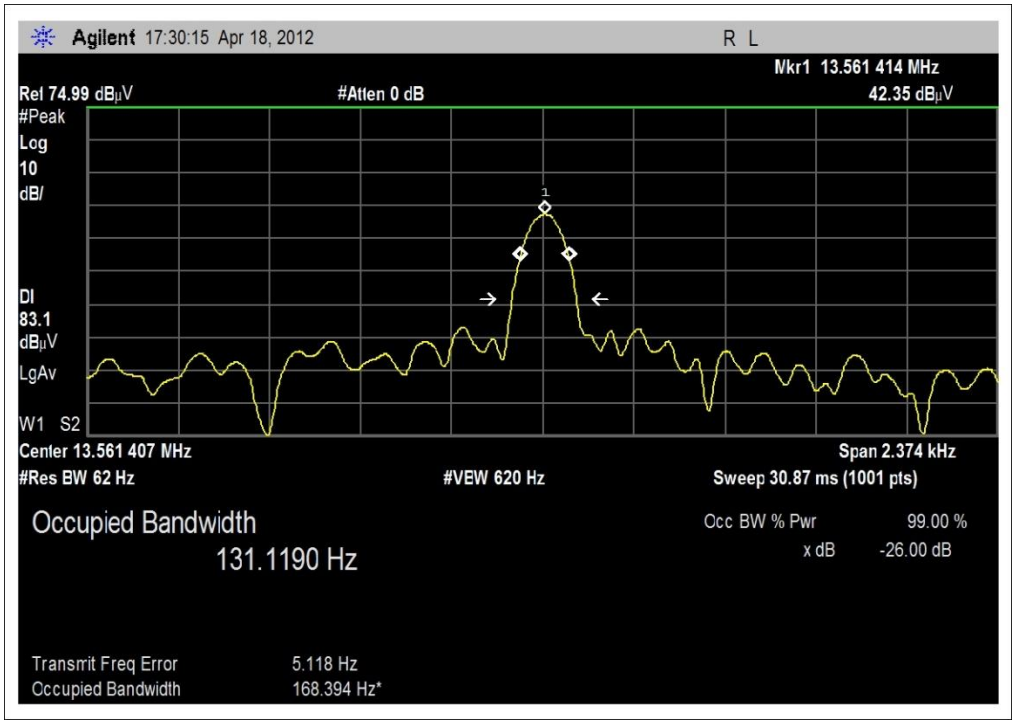
Test Set Up / Conditions

The EUT is set up a wooden table in the center of flush mounted turntable.
The EUT support equipment is located on the flush mounted turntable.
Frequencies investigated: carrier
Clock Frequencies of interest are: 8MHz, 27.12MHz
TX Freq: 13.56MHz
RBW used in accordance with CISPR 16, VBW is greater than RBW
Temperature = 20°C
Relative Humidity = 52%
Pressure = 97.7 kPa

Engineer Name: M. Rauch Jr.

Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN01184	Spectrum Analyzer	8568B	HP	5/4/2011	5/4/2013
AN01183	Spectrum Analyzer Display	85662A	HP	5/4/2011	5/4/2013
ANP01017	Cable		Andrews	3/16/2012	3/16/2014
AN00226	Loop Antenna	6502	Agilent	3/28/2012	3/28/2014

Data


Agilent 17:30:15 Apr 18, 2012
R L
Mkr1 13.561 414 MHz
Ref 74.99 dBµV
#Atten 0 dB
42.35 dBµV
#Peak
Log
10
dB/
1
Dl
83.1
dBµV
LgAv
W1 S2
Center 13.561 407 MHz
Span 2.374 kHz
#Res BW 62 Hz
#VBW 620 Hz
Sweep 30.87 ms (1001 pts)
Occupied Bandwidth
131.1190 Hz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error 5.118 Hz
Occupied Bandwidth 168.394 Hz*

Test Setup Photos

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.